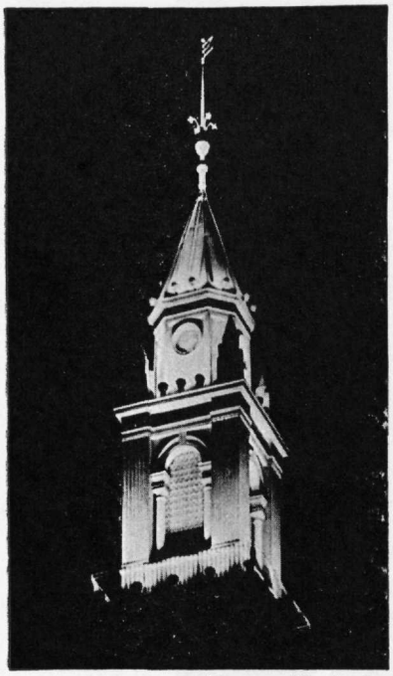

(Courtesy Westinghouse)

EASTMAN KODAK TOWER AT NIGHT

ENGINEERING ABSTRACTS

LIGHT BEAM TRANSMITS VOICE

USING a beam of light instead of a wire to transmit the human voice, physicists of the University of Idaho have invented what might be called a light telephone. Since the system enables persons to talk over long distances without stringing wires and without radiocasting messages to everybody equipped to pick them up, it is believed that the device may prove useful to the army signal corps and to the forest and ranger service. A sensitive photo-electric cell which detects minute changes in the intensity of light makes possible the receiving device. The sending apparatus consists of a flame fed by acetylene and a reflector to force the rays on the receiving point or destination of the message. The burner is equipped with a double gas chamber separated by a thin diaphragm. Talking against the diaphragm moves the gas in the second chamber and so causes the flame to flicker. The sending operator swings the reflector to focus on the intended receiver, and the receiving operator, who may be ten or fifteen miles away, places the photo-electric cell in the beam, which picks up the variations in the light that are too rapid to be detected by the human eye. An electric current, released by the cell according to light intensity changes, operates an ordinary telephone receiver, cell and receiver being attached to a B-battery. —*Popular Mechanics*, January, 1932.

PERKINS TELESCOPE

WHILE it is not the largest, the recently completed reflecting telescope installed in the Perkins Observatory at Ohio Wesleyan University possesses many unusual features, including the first tube to be made of electrically welded structural steel. Its mirror is sixty-nine inches in diameter and was made from the largest piece of optical glass ever manufactured in this country. The mirror weighs 3,790 pounds and the tube 17,000 pounds. The telescope also contains an electric clock which keeps the instrument steadily focused on that part of the sky which is under observation. Through it astronomers are able to view stars 120,000 times fainter than the faintest ones visible to the naked eye.—*Popular Mechanics*.

A NEW MICROSCOPE

A NEW type of microscope has been perfected by Dr. E. Newton Harvey, of Princeton University, and his associate, Alfred L. Looms, of Tuxedo Park, N. Y. Matter under observation is whirled around at the rate of 8,000 revolutions per minute. But the observer gets a clear picture of the specimen.

The new microscope presents a series of images with such speed that they blend into one continuous image. With the instrument scientists can not only observe steps in the deformation of cells being studied but they can even watch the movement of particles within these cells.

After fourteen years of secret experimenting Dr. Royal Raymond Rife, of San Diego, has developed what is claimed to be "the most powerful microscope in the world." This instrument according to the *Pathfinder*, magnifies objects 17,000 times.

Dr. Rife uses quartz prisims in his microscope to break up light waves. It reveals many bacteria heretofore invisible with the most powerful microscope.—*Ohio State Journal*, January 18.

METEORS DART ACROSS SKIES

WHILE most of Ohio slept, one of the greatest displays of meteoric fireworks of the century lighted up the heavens early Monday.

The earth was passing through meteoric matter from two separate constellations—Leo and Gemini.

In Case Observatory, in Cleveland, a little group of scientists headed by Dr. J. J. Nassau worked throughout the night to photograph the spectacular celestial pyrotechnics and thus preserve a record of the phenomenon.

This meteoric shower comes once every 33 years and was first recorded 1000 years ago. It is known as the Leonide shower and is regarded as the most important viewed by astronomers since it comes so infrequently.

The first meteors appeared shortly after midnight. "Some of the falling meteors were as beautiful and spectacular as any I have ever seen," Dr. Nassau said.—*Columbus Citizen*.

HOT BEARINGS INDICATOR

A PORTABLE indicating pyrometer is now being used in detecting hot bearings on locomotives and rolling stock. This instrument, called the Pyro Prod, consists of a highly sensitive milli-voltmeter, to which is attached a pair of thermocouple wires. The wires are pressed against the bearing and the metal, completing the circuit, causes a small flow of current to the indicator. This flow of current increases with the increase in temperature and causes a pointer to deflect over a scale graduated in degrees Fahrenheit. Practically instant readings are made, as it is merely necessary to make contact between the two wires.

The instrument is furnished in several different temperature ranges, but the one most frequently used is from 0 to 600° Fahrenheit. When it is subject to wide ranges of out-of-doors temperature, it can be secured with an automatic "cold-point" compensator. When used on locomotive bearings, it eliminates all guesswork, and a resultant delay if the engineer does not guess right. The instrument has many other industrial uses.—*Railway Age.*

(Courtesy Westinghouse)

THE MOST BEAUTIFUL OF ALL WASHINGTON MEMORIALS

LANDING BLIND

FOG, or reduced visibility, flying is divided into two phases, cross country flying and landing. The former has been more completely developed in recent years than the latter. The radio beacon, improved navigation instruments, etc., have made it easier for the pilot to find his way; but, after he has found the airport, it is impossible for him to land.

The Loth system of energized cables for landing guidance in foggy weather has solved this difficulty. According to this plan, cables are laid in concentric circles under the surface of the ground of the landing field. The signals sent by the two outermost cables give the pilot his direction and also tell him when he passes the boundary of the field. The inner cables give the altitude and tell the pilot when to commence his glide and when to level off his ship.

The cables are energized by means of an alternating

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current of between 500 and 3000 cycles per second. By means of a keying device, the current is interrupted so as to give a characteristic signal. The plane is equipped with a receiving set. Earphones communicate the signals directly to the pilot, and a visual device on the instrument board indicates direction.—*Aviation*, December, 1931.

TWO-THOUSAND-TON YACHT CAROLINE

THE "Caroline" is the largest American-built motor yacht of the year, and also holds the distinction of being one of the finest boats ever built. She excels in design, engineering, architecture, and seaworthiness.

This ship was built at the Bath Iron Works for Eldridge R. Johnson of Moorestown, New Jersey. She is 279 feet in length overall, her beam is 38 feet, and her draft is 15 feet. Because of her steel construction throughout, she satisfies Lloyd's 100 A classification. She has seven water-tight compartments, and a double bottom which brings the total number of water-tight compartments up to thirty-four. She could remain afloat with three of the main compartments flooded.

The power plant consists of 8-cylinder Cooper-Bessemer Diesel engines, which are rated at 1500 b.hp. each. On the acceptance trial, they drove the ship at a speed of 15.5 knots.

One of the "Caroline's" exceptional features is the Sperry gyro-stabilizer, which, on trials, reduced the roll of the ship from 28 degrees to 2 degrees. The stabilizer is hung in two large trunnion bearings which are securely fastened to prevent the supports from pulling out when the ship rolls due to the stabilizer's not being used.

The engine room and pilot house are roomy and comfortable, facilitating easy handling by the crew. The steering and communication equipment is the latest and most efficient developed.

Instead of a yacht, the "Caroline" reminds one of a luxurious apartment. The living quarters, the staterooms, and the serving facilities combine with the mechanical perfections to make the yacht a masterpiece of engineering handiwork.—*Motorship*, November, 1931.

RECLAMATION OF COTTON AND RUBBER IN THE TIRE INDUSTRY

THE modern automobile tire would command a much higher price if it were not for the fact that the manufacturers practice every economy that science has been able to develop. One of the most recent is a process to reclaim scraps of rubber and cotton that are cut from the uncured tire during manufacture. The scraps consist of cotton cords imbedded in uncured rubber. A thousand pounds of these scraps are loaded into a revolving cage with walls of monel-metal screen. The cage is lowered into a tank of benzene and agitated for two hours, after which the benzene is drawn off and fresh benzene added for a half-hour washing. Six of these washes, the last two using all the rubber, leave clean, white cotton shreds. This cotton still contains some benzene, and this is removed by passing steam through it. The steam is condensed and the benzene recovered for further use. The cotton is sold for paper manufacture, felt compositions, or as cotton floc.

The rubber remains in the benzene as a 6 per cent solution, and this is used in the factory to impregnate the cotton used in the manufacture. Nothing is lost by this reclamation process. One thousand pounds of scrap yield 1200 gallons of the rubber solution and 400 pounds of cotton.—*Scientific American.*

AN INSEPARABLE METALLIC BOND

A NEW process has been developed for producing a homogeneous bonding of metals and alloys which will withstand vacuum, severe vibration, mechanical shocks, and changes of pressures and temperatures close to the melting point of the metals themselves. A molecular fusion takes place between the metals throughout the entire surface treated, whereby the metals are bound together molecularly at every point and act as a single homogeneous unit.

Steel, cast iron, brass, bronze, copper, and other metals have been covered with lead, tin, and so on, to withstand corrosion or other severe plant operating conditions. The process has been put to considerable service in plating autoclaves, kettles, plates, tanks, tubing, and various other types of equipment suitable for the chemical refining and process industries.—*Scientific American.*

LOS ANGELES WATER SUPPLY

NOWHERE in the world can people live in numbers greater than can be adequately supplied with water; if the water supply is limited so is the population.

At the present time Los Angeles and neighboring cities are planning to build a river. This river will be almost twenty times as large as the Los Angeles River and will supply water for seven and a half million people.

This river starts at the Colorado River, below the new Boulder Dam, follows a man-made course for two hundred and sixty miles, through tunnels, in concrete channels, and in some cases climbs hills a quarter of a mile in height. Hydro-electric plants along the route will furnish electric power for the cities.

The proposed river will cost two hundred million dollars and will require eight years for completion. A shortage of water is anticipated in 1933 and plans are under way to arrange means to meet this shortage until the new river is completed. The water necessary to meet the anticipated shortage will come from the Owens River and the rainfall in the Owens Valley.

Man's battle to keep water within his reach never ceases.

Wife: "John, did you mail that letter?"

Professor: "Yes, my dear, I remember very distinctly mailing it in the first mail box I came to. You can see for yourself that it isn't in any of my pockets."

Wife: "That will do, John, I gave you no letter to mail."